

and lagoons on the coast, and occasionally one strays inland. They appear to feed on insects. Their flight is heavy, and against a strong wind they are able to make but little headway.

PÆCILONETTA ERYTHORHYNCHA (Gmel.). Red-billed Duck.

Female. Iris dark brown; ridge of the upper mandible dark brown; sides and base of the upper mandible, and also the lower mandible pale or flesh-colour; tarsi and feet dark ash-colour; webs nearly black.

These Ducks inhabit the lagoons, and are not very common; they are less shy than most other wild-fowl here. The few that I have seen have been either single or in pairs.

[I regret to find that I have committed the error of enumerating this species twice, viz. as No. 62 in 'The Ibis,' vol. i. p. 251, and as No. 142 in vol. iii. p. 134.—J. H. G.]

DENDROCYGNA VIDUATA (Linn.). White-masked Duck.

Male. Iris dark brown; bill black; tarsi and feet bluish ash-colour.

I found a flight of about a dozen of these Ducks in a lagoon near the mouth of the River Umlass in the month of June. They were very wild, but after some trouble I got a long shot at them with one of Eley's cartridges, and succeeded in bagging three. They all varied in size and plumage, the one sent being the largest and handsomest. When standing on a mud-bank, in consequence of their rather long legs and necks they looked more like small geese than ducks. In flight also they much resembled Geese; there was an evident inclination to form a regular figure; and when they flew round near where I was concealed, they constantly uttered a sort of whistling cackle.

XIX.—*Some Remarks on the Genus Balæniceps*. By Dr. J.

REINHARDT, Professor at the Royal Museum of Copenhagen, Foreign Member Z.S.L., &c., &c.*

OPINIONS pretty much at variance respecting the affinities of this genus have been propounded. Not to mention that Gould, when

* Translated from the 'Transactions' of the Royal Danish Scientific Society for April 1861, pp. 135–154.

some ten years ago he gave the first account of it, would have it considered as the representative of the Waders among the Pelicans, it has subsequently been looked upon by Des Murs, on account of the characteristics of its eggs, as most nearly related to the Flamingo, and placed between that bird and the Spoonbill, while, according to Jules Verreaux's opinion, it stands closest to the large-billed Stork-like *Leptoptilus*. By Henglin, also, it is referred to the Stork family, and therein finds its place between *Anastomus* and *Dromas*. The opinion which seems to be most generally received now is, that *Balæniceps* should be put alongside of *Cancroma*, and looked upon as a gigantic African representative of this American generic form.

It appeared to the author that this was not the right way of considering the genus *Balæniceps*. According to his opinion, another peculiar and equally African bird, which hitherto no one, so far as he knew, had thought of bringing into comparison with it—*Scopus umbretta*—was in reality its nearest of kin, and inasmuch as the genus *Scopus* is evidently more nearly allied to the Storks than to the Herons (from which, again, *Cancroma* cannot be separated), those ornithologists who have assigned a place among the former to *Balæniceps* must be considered as having approached the truth more nearly than those who have placed it alongside of *Cancroma*.

What has mainly led to the belief in a near relationship between *Balæniceps* and *Cancroma* is a certain resemblance in their bills. A closer investigation, however, would show that there exists no real affinity between them in this respect. In all the rest of its structure *Cancroma* is a Night-Heron (*Nycticorax*), distinguished by a particular shape of bill; but, in accordance herewith, its bill, notwithstanding its aberrant form, shows many characteristics of the Heron's bill. In the particular structure of the bill of *Balæniceps* we perceive, on the contrary, another type; and even the likeness it outwardly bears to the contour of that of *Cancroma* is, on nearer inspection, by no means so great as would appear at first sight. The bill of *Cancroma* is remarkably flattened, and not so much calculated for great strength as for great roominess; and this is still more increased by the naked dilatable skin between the branches of the lower

jaw, which can be distended into a complete pouch or bag, hanging down as far as the throat. The bill of *Balæniceps*, on the contrary, is at the base rather high than broad; its sides (*paratomia*) are well arched, but still steep, and not, like those of *Cancroma*, nearly horizontal. The whole bill, in comparison with that of the last-mentioned bird, must be called compressed rather than flattened. It is clear that nature's aim has been to render it pre-eminently powerful; and the fact of the skin between the branches of the lower jaw being thickly covered with feathers for at least two-thirds of its extent is enough to show that no real faucial pouch is to be found in the *Balæniceps*. On continuing the comparison between the bills of the two birds, we find in *Cancroma*, as in the Herons generally, a little notch in the edge just behind the point, but not a trace of the powerful hook which terminates the upper mandible in *Balæniceps*, and which, together with the entire ridge (*culmen*), is sharply separated from the sides by a deep furrow. Just as little is the lower mandible truncated at its point to make room for the terminal hook. Finally, the nasal grooves as well as the nostrils of *Cancroma* resemble those of the Herons, but differ materially from those of *Balæniceps*, in which the former are extremely small, and the latter appear as lines or slits just perceptible, and are placed high up near the culmen and close to the base of the bill.

While differences are thus visible in almost every single part of the bill in *Balæniceps* and *Cancroma*, it will be easy on the other hand to point out in that of the genus *Scopus* (notwithstanding its, at first sight, different aspect) all the characteristics which distinguish the bill of *Balæniceps* from the bill of *Cancroma*. Thus in *Scopus* is found the hook with which the upper mandible of *Balæniceps* is furnished—somewhat smaller comparatively, it is true, than that of the latter, but, together with the entire culmen, just as sharply separated from the sides by a deep furrow. Moreover the lower mandible is truncated towards its point, in the same manner and for the same reason as in *Balæniceps*. Finally, the nostrils in *Scopus* also are narrow slits near the base of the bill. Even the sharp keel formed by the bill of *Scopus* is already exemplified by the raised ridge which runs along the middle of the flat culmen in *Balæniceps*; and if one

imagines the bill of the latter to be so much squeezed together as to be metamorphosed into a cutting edge, and the branches of the under mandible towards the point to be tightly compressed, it would exactly resemble a gigantic but rather short *Scopus*-like bill.

One cannot so certainly conclude from the form of the foot, as from the bill, to which of the two birds named, *Balæniceps* most approaches; *Scopus* and *Cancroma* differing, with regard to their feet, but slightly from each other; and the most essential characters, therefore, in this respect, which distinguish *Balæniceps* from the one, must also separate it from the other. Each of these two birds has a long hind toe, inserted on a level with the fore toes, which, when the bird walks, touches the ground for its whole length. In both, the fore toes are united at the base by a membrane. The difference between their feet exists principally in the membrane of *Scopus* being somewhat larger than that of *Cancroma*, while, on the other hand, the hind toe of the last is a little longer. In *Balæniceps* the foot is mainly constructed after the same type, but every vestige of a membrane between the fore toes is wanting; and these, as well as the back toe, may be even a little longer than in *Cancroma*. So far, its form of foot may perhaps be said to stand nearer to the latter than to *Scopus*; a great difference, however, prevails in a point not less important. In *Cancroma*, as in all Herons, the middle claw is pectinated along its entire inner edge; in *Balæniceps* there is no trace of such a structure; while *Scopus* in this respect forms a connecting link, the claw being certainly serrated though only for a portion towards the tip, and the pectinations being neither fine nor particularly regular. If one now considers that such a pectinated middle claw is undoubtedly to be found elsewhere than in the Heron family, but in that family is otherwise never wanting*, its absence in *Balæniceps* really seems to imply a strong warning against giving this bird a place at the side of *Cancroma*,

* To this rule only the genus *Eurypyga* would afford an exception, if indeed it can with justice be referred to the Herons. But, in the author's opinion, this genus is most rightly comprehended when it is placed in the neighbourhood of the Water-hens, as has formerly been done by Buffon, and as at the present time Des Murs and Olph-Galliard arrange it.

and therefore among the Herons, where its reticulated tarsi also are not rightly at home.

Extending the comparison between the three birds in question to the plumage (*ptilosis*), it will also be found that in this respect *Balæniceps* is more nearly allied to *Scopus* than to *Cancroma*. In the last, as generally in Herons, the basal downy portion of the webs is comparatively small, and there is scarcely any down intermixed with the true feathers. In *Balæniceps* precisely the contrary is the case. The downy portion of the webs is large, and genuine down is found intermixed with the feathers in some quantity, just as with the Storks in general and *Leptoptilus* in particular. Moreover the accessory plumule (*hyperrhachis*) is large and well developed in *Cancroma*, but very small in *Balæniceps*, which in this respect also is most nearly allied to *Scopus* and the Storks, among which, as is known, there are some species without any accessory plumule whatever. With a stuffed bird, the division of the feathers into regular patches (*pterylosis*) cannot be minutely examined, especially when its rarity obliges one at the same time to be careful of it. Therefore, as the specimen of *Balæniceps* which the Royal Museum possesses was already stuffed when it arrived, the author has not been able to assure himself regarding this bird's pterylosis; meanwhile it appears to him that *Balæniceps* is quite as near to *Scopus* as to *Cancroma* in this respect. In the last the pterylosis is essentially the same as in the Herons, while *Scopus* presents the same distribution of feathers as the Storks, but differs from them and from most, if not from all, other birds in having four patches (*pterylæ*) and four rows of feathers (*apteria*) running along the neck. In *Balæniceps* the neck appears to the author to be everywhere beset with feathers; and if it be so, this is a great deviation from *Scopus*. But supposing this deviation to be of little account, as in this respect the latter stands so completely isolated, a neck clothed all round with feathers would fairly bring *Balæniceps* nearer to the Storks, but not to *Cancroma*, which, like the Herons, has a broad row of feathers along the back and a similar one along the front of the neck. One of the most essentially distinctive marks by which the Stork-family is separated from the Herons in their pterylosis is the great development of the two patches of feathers

on the under surface, which in all the forms belonging to the Storks extend in front nearly to the keel of the breast-bone, and thus have only a very insignificant row of feathers between them. In *Cancroma* and the rest of the Herons, on the contrary, they each consist only of some few rows of feathers; and accordingly are separated in front by a very broad space about the region of the fureula, where are found two oval powder-down patches. *Balæniceps* in this respect entirely approaches *Scopus* and the other Storks; its breast is throughout its whole extent covered with feathers, and Mr. A. Bartlett has quite recently shown that in this region no powder-down patches are found*. These, as is known, are in the Herons not confined to the breast, but are also found on the loins, and most frequently on the groin, while none have hitherto been found in the Storks. Now, how far *Balæniceps*, in addition to the powder-down patches on the breast, also wants others must remain for more complete investigation. Mr. Bartlett, in his notice, says nothing about it. The affinity which the author believes to exist between *Balæniceps* and the Storks unquestionably bespeaks their absence: but at the same time it must not be overlooked that these powder-down patches are not exclusively characteristic of the Herons; for they are not only found on the loins of the genus *Eurypyga* (the separation of which from the Herons many perhaps will complain of, though with them their presence cannot in consequence be of significance), but even in birds of quite different orders, for instance, in some of the Birds of prey.

Should it be asked which of the two often-named birds the whole appearance and outward character of *Balæniceps* most calls to mind, one must again answer, *Scopus*. Its extraordinarily large head, and the comparatively short but very thick and ponderous neck thereby necessitated, not only in themselves remind us more of *Scopus* than of *Cancroma*, but the colossal proportions of these members would be a complete anomaly in a Heron, while it scarcely needs to be remarked that there are Storks which in size of head and thickness of neck are hardly inferior to *Balæniceps*.

A short exposition of the author's views of the genus *Balæni-*

* 'Proceedings of the Zoological Society of London,' 1860, p. 461.

ceps was last autumn laid by him before the Zoological Society of London, of which he has the honour to be a foreign member, and was printed in the Society's 'Proceedings'*. He has, nevertheless, again treated the subject here, because he feels convinced of being still better able to substantiate the correctness of his opinion. Until a short time ago, nothing had been made known concerning the internal structure of this remarkable bird. The author himself, when making his first communication on the subject, had but a single stuffed specimen at his disposal, and therefore was only able to consider its outward form. He was, however, of opinion that the question of its affinities could be solved with tolerable safety from its external characters. He does not share the somewhat general opinion that the so-called anatomical characters derived from the internal structure should of themselves, and in all cases, be preferred to the external ones; but he of course acknowledged that, in *Balæniceps*, these, and especially its skeleton, might furnish important elucidation of its real affinities. He is now able to take at least the skeleton into consideration, partly since he has lately procured a cranium of this rare bird for the Royal Museum, and partly because Mr. W. K. Parker has made use of the opportunity offered by the death of one of two *Balænicipites* brought alive last year to London, to make its osteology the subject of an investigation, which he had communicated to the Zoological Society at the meeting immediately preceding that at which the author's notice of this bird was read, and an account of which has been since printed in the Society's 'Proceedings'†.

First, as regards the skull, in which certain peculiarities are at once perceptible, to be found neither in *Scopus* nor in *Cancroma*, indeed neither in the Storks nor Herons. But these, in fact, are only the result of the extraordinary development of the bill; and some of them, at all events, are noticeable in particularly large-billed birds belonging to entirely different orders. Of such peculiarities, very interesting in themselves, but of little moment in regard to the affinities of *Balæniceps*, must particularly be named the complete ankylosis of all the different bones forming the lower jaw, so that there is not the least trace left of

* P. Z. S. 1860, p. 377.

† P. Z. S. 1860, p. 324.

the sutures between them,—a circumstance likewise found in the Hornbills, Toucans, and Parrots. Next must be considered the very extraordinary clumsiness of the zygomatic arch, which, with a length of two inches, is four lines thick and six to seven lines high, thus offering dimensions which it does not obtain, even approximately, in any other bird. Lastly, the proportions of the lachrymal bone are to be observed. This bone is not only brought forward in front of the hinge between the bill and the brain-pan, as is the case, though rarely, in some other birds, but its vertical branch also is throughout its whole length anchylosed with the bill, so that the larger or smaller aperture leading to the nasal cavity, and otherwise found between these parts, entirely disappears. In consequence it seems at first sight as if, against all rule, it was the bill itself that forms the boundary to the orbit; a formation to which at the utmost but a distant analogy can be shown in the Owls, and partly in the Hornbills, inasmuch as with them the lachrymal bone approaches close to the bill, but does not unite with it.

When the special characters just discussed are set aside, it will not be difficult to demonstrate in the skull of *Balæniceps* an essential correspondence with *Scopus* and the Storks generally, and particularly a greater resemblance to them than to *Cancroma* and the Herons. A pervading difference between the skulls of the Herons and the Storks consists in the cranium proper, or brain-pan, being comparatively much longer in the former than in the latter, whereupon follows a corresponding difference in the length of the zygomatic arch. In other words, the Herons are distinguished by a considerably elongated brain-pan, while in the Storks the brain-pan is comparatively short. This contrast can hardly be overlooked, whatever forms of the groups in question be examined; but it is most conspicuous when two, the heads of which have about the same absolute length, are selected, for instance, the Common Bittern (*Botaurus stellaris*) and *Scopus umbretta*. It will then be found that in the former the brain-pan (measured from the moveable supra-maxillary hinge) is nearly half the length of the latter, and not quite one-third that of the cranium, and that the zygomatic arch is precisely twice as long in the former as in the latter. In entire

accordance herewith, the zygomatic arch in *Cancroma* is almost twice as long as in *Scopus*, though the skull of the former is somewhat shorter than that of the latter. In this comparison *Balæniceps* agrees fully with the Storks. The broad and particularly short brain-pan is precisely one of the most prominent features of its skull; and it even surpasses in this respect both *Scopus* and the other forms of the family, with the exception perhaps of *Anastomus*. Notwithstanding the extraordinary difference in the size of each of these birds, the immensely clumsy and thick zygomatic arch in *Balæniceps* is hardly longer than in *Cancroma*, and it is superfluous to explain how much shorter it must be comparatively, and how great a difference in this respect exists between these two genera. Comparatively, also, the zygomatic arch is shorter in *Balæniceps* than in *Scopus*, and would be still more so if the extremity of the brain-pan was the only point whereby its length could be determined. But it is also affected partly, though in a small degree, by the position of the tympanic bone; and as this is nearly perpendicular in *Balæniceps*, while in *Scopus* it is placed obliquely with its lower end (to which the zygomatic arch is attached) in front, the latter does not reach backwards so far in the last as in the first-named bird, and accordingly is somewhat shorter than the length of the brain-pan required. Just as *Balæniceps* resembles *Scopus*, *Anastomus*, and the other Storks in the shortness of the zygomatic arch, so it also harmonizes with them in its oblique position, and, to be brief, makes therewith a considerable angle with the bill, while in the Herons it is on a level.

Another difference in the skulls of the Herons and of the Storks seems to be that the partition between the orbits in the former is broken by a large aperture, filled only by a nervous membrane, while no such aperture is found in Storks, and especially not in *Scopus*, *Anastomus* (*lamelligerus*), or *Leptoptilus* (*javanicus* and *dubius*). In this point also *Balæniceps* follows *Scopus* and the Storks, whereas *Cancroma*, as far as the author can infer from the somewhat imperfect cranium of this bird at his disposal, approaches the Herons.

It has been already stated that in *Balæniceps* is found a real hinge between the brain-pan and the bill. It is hardly less de-

veloped than in the Parrots; but it is situated much further back than in them, since, on account of the peculiar position of the lachrymal bone, it is placed above the anterior portion of the orbit, and not, as usual, in front of it. Neither in *Scopus* nor in *Cancroma* is there such a hinge; but its exemplification is found both in *Leptoptilus* and *Tantalus*, which have a deepish cross-suture increasing the mobility of the bill, while the author has not found the least trace of such a peculiarity in the Herons. So far then this hinge is a less aberrant character in *Balæniceps*, if the bird be considered as most nearly allied to the Storks, than if it be made a Heron-like form connected with *Cancroma*.

Mr. Parker has justly urged the forward position of the lachrymal bone as a peculiarity of the cranium in *Balæniceps*; however, as already remarked, the bird does not stand alone in this respect, for in the Owls that bone is situated in front of the supra-maxillary hinge. What, however, ought to be insisted on, and what Mr. Parker, who only compared *Balæniceps* with one Stork (the Adjutant), has not remarked, is that the very position of the lachrymal bone refers the bird to the Storks more than to the Herons. For, in *Scopus*, the same bone is already advanced, so that its anterior extremity reaches a little in front of the cross-line, by which the pliability of the bill is effected, though in this bird it is not marked out by any suture in the bone; while in *Anastomus* the lachrymal bone reaches fully three-fourths of its length in front of the line in question, so that in this respect there is but a short step from it to *Balæniceps*.

The case is the same with another character in the cranium of *Balæniceps* insisted on by Mr. Parker—the small boss or knot formed by the ridge of the bill a little behind the nostrils. In *Cancroma* and the Herons it is certain that no trace of it can be found, and the base of the bill has here quite a different form. But, on the other hand, one has only to hold the cranium of *Scopus* alongside that of *Balæniceps* to perceive at once that it is the same type which prevails in this part of the skulls of both; and there will be found a still greater likeness shown by *Balæniceps* in this and other particular points to another frequently mentioned Stork, namely *Anastomus*.

It has been already remarked by Mr. Parker that there is no harmony between *Balæniceps* and the Herons in regard to the bones of the palate, and that in this respect it rather resembles the Adjutant and Pelicans, particularly the latter, inasmuch as these bones anchylose posteriorly, and along the line of ankylosis there stands out a prominent crest just as in *Balæniceps*. A nearer comparison, however, shows that the resemblance to the Pelicans extends to these two points only, and that the palatal bones of the latter serve as a support to the inter-orbital septum (*os ethmoideum*) for a very short way only, and that for the rest, compressed into an extremely sharp keel, they extend underneath as far as, but at a considerable distance from, the septum, which also terminates in a sharp edge. In *Balæniceps*, on the contrary, the highly anchylosed palatal bones are hollowed out just above into a deep channel, which receives the lower rounded and thick margin of the inter-orbital septum, and slides backwards and forwards on it. But this development of the palatal bones is also exactly characteristic of the Storks in general, of *Anastomus*, and of *Scopus*, and in the latter they are found anchylosed posteriorly just as in *Balæniceps*.

The inter-articular bones (*ossa pterygoidea*) are not exactly those in the structure of which substantial grounds for making *Balæniceps* rather a Stork than a Heron can be expected to be found; still their short powerful form does more towards ranking it with the former than the latter group. And, lastly, in regard to the tympanic bone, which most decidedly, together with certain similarities to, also presents differences from, that of *Scopus*, we remark that these differences do not bring it any nearer the same bone in the Herons. This distinction is especially shown in the peculiar form of the articulating surfaces of the lower jaw, which are found to be in front of and inside the setting-on of the pterygoids. In *Balæniceps* the articulation is effected by two condyles of unequal size and height, to which corresponds a socket on the lower jaw, in form of two channels separated by an intervening ridge, so sharply defined and so closely embracing the articulating surface of the tympanic bone, that, in contemplating the dried skull, one is at some pains to comprehend how it can admit of the requisite mobility. Just as little in *Scopus* and other

members of the Stork group does the corresponding articulation show a similar form. But, as already remarked, it is equally as little the case with the Herons, in which the process, verging inside towards the orbit, is at the same time turned; so that, contrary to what is seen in *Balæniceps* as well as in *Scopus* and the Storks generally, it does not present an angular but a flat surface above towards the brain-pan.

The skull is the only part of the skeleton of *Balæniceps* which the author has himself seen. Of all the remainder he has only such knowledge as he can glean from Mr. Parker's investigations of the bird's osteology; and it is but an abridgement from them that he has at his disposal,—the entire paper intended to be embodied in the Zoological Society's 'Transactions,' if it has already appeared, not having yet met his eye*. It cannot be expected that this abridgement in every particular point should give a full explanation; and further, Mr. Parker, who considers *Balæniceps* as "strictly an Ardeine bird," and "more nearly related to *Cancroma* than to any other known type," having taken no notice of *Scopus* in the comparisons he has instituted between the former bird and sundry others, it is very possible that there may be similarities as well as dissimilarities between the bony structure of the body and limbs of *Balæniceps* and *Scopus* which have escaped the author. He believes, however, from the short description of the English naturalist, that the similarities can be proved to predominate.

From what Mr. Parker remarks, it may be seen that the osteology of *Balæniceps* differs in many points from that of *Cancroma*, in spite of the near affinity which he thinks exists between them. Thus, for example, a difference appears in many respects in the sternum and furcula, and the former is (in Mr. Parker's words) intermediate between that of the Stork and the Cormorant. For in one way its keel, as in the last-named bird, extends further in front of the articulation of the coracoids than in the Herons and Storks; and again, the furcula, as in that bird also and in the Pelicans, is completely ankylosed with the extremity of the sternal keel. Moreover the latter is lower than

* This has lately been published, and forms Part 6, vol. iv. of Trans. Zool. Soc.; *vide antea*, pp. 78, 79.—TRANSL.

in the Herons, the so-called *spina sternalis* is wanting, and, in addition to the emargination at the posterior end of the sternum which appears in the Herons and Storks, there exists another and smaller one, nearer the keel. The sternum of *Balæniceps* differs more from that of *Cancroma* than from that of the Herons proper, in which the sternal keel is connected with the furcula by means of an articulation, as this in *Cancroma* does not touch the sternum. Neither, however, is that the case in *Scopus*; and it must be confessed that the points in which *Balæniceps* is said to differ from *Cancroma* separate it also from *Scopus*. But they are of little weight; even the most striking of them, the ankylosis of the furcula with the sternal keel, may, as Mr. Parker shows, be suddenly revealed in one peculiar member of a family or even of an order* where it generally does not appear, as it may be also found in some and wanting in other birds more nearly related to each other†.

But even if, from what Mr. Parker states respecting the sternum of *Balæniceps*, no sure conclusions can be drawn regarding its affinity to either of the birds so often named, or to the Storks rather than to the Herons, it is not therefore impossible to derive reasons from this bone in favour of adopting one opinion rather than the other; for a very perceptible difference in the sternum seems to prevail between the Herons and the Storks. In the former (*Ardeæ cinerea*, *herodias*, and *egretta*) the right coracoid is attached with its inner and lower angle lapping over the left, and the sockets or articulating surfaces of these bones on the most prominent rim of the sternum are thereby rendered quite crooked and unsymmetrical. In the Storks (*Ciconia nigra*, *Leptoptilus javanicus*) these articulating surfaces are, on the contrary, symmetrical; and *Scopus*, in this as in so many other points, harmonizes with them. I regret not being able to speak as to *Cancroma* in this respect; but no further explanation is needed to show that it would be important to obtain information on the subject, and also to ascertain

* For instance, the Secretary (*Serpentarius reptilivorus*) among the birds of prey.

† The ankylosis is found in *Grus antigone* and *G. americana*, but not in *Balearica pavonina*.

whether *Balæniceps* herein agrees with the Herons or (as I consider will be most probable) with the Storks.

The pelvis, from its long narrow form, is said to resemble that of *Cancroma* more than that of either the Storks or Herons, but also to differ from all these birds in not expanding anteriorly in the form of a plate, so as to cover the upper extremities of the posterior ribs. On the strength of this brief description, it is difficult to say how great or how little harmony it may display with that of *Scopus*, in its entire formation. But in one, though not very important, point it resembles that of the latter more than that of *Cancroma*, inasmuch as the side-bones (*ossa ischiî*) reach further back than the hip-bones (*ossa iliî*), exactly as in *Scopus*, while just the reverse is the case in *Cancroma*.

Finally, when one turns to the vertebræ and the ribs, there will be found in some of the cervical vertebræ of *Balæniceps* a canal formed by a small bony bridge on the lower side of these bones upwards towards their anterior extremity, along which the carotid artery runs,—a peculiarity which is also possessed by the Herons and *Cancroma*, besides some other birds (*Pelecanus*, *Sula*), but is wanting in *Scopus* and the great majority of the Storks. Still in these it is not entirely unknown, since, as Mr. Parker shows, it occurs in *Mycteria australis*. Thus it is not, even in the order of Waders, an exclusive character of the Herons, and its absence or presence cannot be of very great value. A greater importance might be attached to the number of vertebræ in the different portions of the vertebral column, as well as to the number and relative position of the ribs; and herein, as appears from Mr. Parker's own statement, *Balæniceps* harmonizes both with *Scopus* and furthermore with the Storks, but differs entirely from *Cancroma*, which again in this circumstance approaches the Herons as much as *Balæniceps* does the birds just named.

Indeed, in *Balæniceps*, as in *Scopus* and *Leptoptilus*, there are found twenty-one separate and reciprocally moveable vertebræ between the head and the sacrum; and in the true Storks the number is even less by one. On the contrary, the Herons and *Cancroma* have twenty-three vertebræ within that space. Of

these, fifteen are cervical vertebræ in every member of the group with the exception of the true Heron (*A. cinerea*), which has sixteen; and thus it is in the number of the dorsal vertebræ, and consequently of the ribs also, that the difference becomes most manifest. *Balæniceps*, *Scopus*, and *Leptoptilus* have six reciprocally moveable dorsal vertebræ, and the White Stork five*; *Ardea*, on the contrary, has seven, and *Cancroma* as many as eight. Perhaps the harmony in the number and position of the ribs is still more striking. For in *Balæniceps*, as well as in *Scopus*, *Leptoptilus*, and *Ciconia*, there are seven pairs of ribs. Of these, with the exception of *Scopus*, which has only one so-called false rib on either side, the two anterior pairs are false ribs, which do not touch the sternum. In none of them are found any posterior false ribs; for even the single or (in the White Stork) the two pairs which are attached to the sacrum and pelvis reach the sternum and are furnished with sternal costæ. In *Cancroma* and *Ardea* the proportion is essentially different; for these birds have respectively nine and eight pairs of ribs, of which in *Cancroma* the four, and in the Heron the three, anterior pairs are false ribs; and although in these birds the posterior pair are attached to the pelvis, yet, according to Mr. Parker, they do not touch the sternum as is the case in the Storks.

Thus it also appears that in the osteology of *Balæniceps* there is manifested a preponderant approximation to *Scopus* and the Storks, rather than to *Cancroma* and the Herons. It is not, however, intended to be denied that there are some few points in which a similarity to *Cancroma* may not likewise be traced. The study of the skeleton of *Balæniceps*, therefore, confirms

* Nevertheless the whole number of dorsal vertebræ in the White Stork is not really less than in its allied genera. For in all the other birds named above, Herons as well as Storks, there is one pair of ribs attached to the sacrum and back, but in the White Stork, on the contrary, there are two pairs so attached. The fact is, that in the last-mentioned species two true dorsal vertebræ coalesce with the sacrum, but in all the others only one. This difference which appears between the White Stork and all its allies, in the number of free vertebræ lying between the head and sacrum, is also without real significance, since taken absolutely all the Storks here mentioned have fifteen cervical and seven dorsal vertebræ; *Cancroma* and the Herons, on the other hand, have fifteen and eight, or sixteen and seven.

clearly the result to which the examination of its external characters had led; and, in the author's opinion, this bird, together with *Scopus*, forms a small separate group among the Storks (*Ciconinæ*), to which perhaps *Anastomus* might be added.

Postscript.—During the interval which has elapsed between the presentation and the printing of the above notice, the author has received some new information respecting the structure of *Balæniceps*, which induces him to add two further observations.

The August number of the 'Annals and Magazine of Natural History' has brought him a report of the proceedings at the Zoological Society's Meeting of the 26th of March, 1861, containing a short communication from Mr. Bartlett on a new investigation of the bird in question, which he had had the opportunity of instituting after the last of the *Balænicipites* sent to the Zoological Gardens had died.

The most important discovery which Mr. Bartlett has made on this occasion is, that over the loins there is a large powder-down patch, or, it may be said, two patches united posteriorly*, which he had not before noticed when examining the living bird. But this patch is the only one that exists. Neither on the breast nor on the groin is there a trace of one, and so far his former statement is corroborated. That such a powder-down patch is a curious anomaly in a Stork, and a surprising approximation to the Herons, cannot be denied; and Mr. Bartlett does not hesitate to see in its existence a decisive proof that *Balæniceps* must accordingly be reckoned among these last. The author, however, cannot attach so great an importance to the powder-down patch. It does not seem to him admissible that it should weigh more than the pervading affinity to *Scopus* and the Storks, which in so many ways otherwise shows itself in *Balæniceps*. Nor is it without moment that the patch discovered is precisely that which is occasionally found out of the Heron group, while there is no trace of the breast or groin patches which are exclusively peculiar thereto. Mr. Bartlett seems to doubt the

* Mr. Bartlett in his notice says there are "two large, well-defined powder-down patches" (*l. c.* p. 187); but the woodcut annexed presents the appearance spoken of above.

correctness of Nitzsch's assertion that such loin patches sometimes appear in other birds besides the Herons. But there is no reason whatever for such a doubt; and had he only examined some of the birds which Nitzsch names, as *Nauclerus furcatus*, *Elanus melanopterus*, and the species of *Circus*, he would certainly have easily found them, for they are indeed large enough. At all events Mr. Bartlett's discovery does not prove any very great approximation to *Cancroma*. On the contrary, if *Balæniceps* should really be referred to the Herons, there is not one of them from which it should not be further removed than from that genus, in regard to the powder-down patches. For, besides the three pairs known previously in *Cancroma*, Mr. Bartlett has discovered a fourth pair, placed between the shoulders, and overlooked by Nitzsch. That this interesting observation is quite correct, I have had the opportunity of ascertaining for myself in several skins of this bird. Nor should it be forgotten that, though powder-down patches certainly form a very important pterylographic distinction between the Herons and the Storks, yet they are not the only one. Independently of them, from the pterylosis of *Balæniceps* there can be unquestionably deduced either one or the other opinion. It is therefore much to be regretted that Mr. Bartlett says nothing else about the position of the feathers, and so does not appear to have profited by the excellent opportunity he had of becoming acquainted with it.

Setting aside the degree of importance to be attached to the observation consequent on the discovery of the loin patch in *Balæniceps*, there has been really proved, as above admitted, an approximation between that bird and the Herons; but otherwise the author has found nothing whatever in Mr. Bartlett's notice which can be said to be demonstrated. It is certainly asserted that *Balæniceps*, in regard to its intestines, agrees generally with the Herons: "the stomach, liver, intestines, &c., of the two birds appeared exactly to correspond in structure and arrangement." But that this rather vague statement, enunciated as a generality, should be taken according to the strict sense of the words, can hardly have been Mr. Bartlett's intention; for in order to be invested with any especial force of proof, it ought to have been declared as well, whether *Scopus* and the Storks

